

**Cheng, Ta-Pei. Relativity, gravitation, and cosmology: a basic introduction.**

Oxford, 2005. 339p bibl index afp ISBN 0-19-852956-2, \$99.50; ISBN 0-19-852957-0 pbk, \$44.50 . Reviewed in 2005sep CHOICE.

Cheng's book is intended as an introductory work for advanced undergraduate students; it begins with a physics-based development of the key concepts in special and then general relativity. Cheng (Univ. of Missouri) introduces the equivalence principle and shows how it leads to the concepts of time dilation, length contraction, and curved space-time. This introduction is very accessible to students who have had freshman- and sophomore-level courses in Newtonian physics and electrodynamics. Cheng develops basic concepts in differential geometry and finally the full field equations for general relativity. With this groundwork laid, the remainder of the book discusses modern cosmology and relativistic astrophysics, including black-hole physics and inflationary cosmology. The book is well written and illustrated and has a satisfactory bibliography. It also includes answers to selected homework problems. Instructors will find it useful and libraries will want to have it on their shelves as a reference for students interested in learning these subjects on their own. **Summing Up:** Recommended. Upper-division undergraduates; graduate students. -- *A. Spero, formerly, University of California, Lawrence Livermore National Laboratory*